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THE FOOD-PLANTS OF EUROPEAN BUTTERFLIES.

BY S. H. SCUDDER, CAMBRIDGE, MASS.

Kaltenbach is publishing a work entitled *Die Pflanzen-Feinde aus der Classe der Insecten*, two parts of which have appeared and carry the investigation through the willows. He enumerates all the German insects known to feed upon particular plants; annotated lists of more than three hundred species of insects are sometimes ascribed to a single tree. Among these are many butterflies, and by collating them I have prepared the following list, believing that, as it is fuller than any yet published, it will be of great service to those who are endeavoring to discover or extend the histories of our own butterflies. As soon as the work of Kaltenbach is completed, a supplement will be prepared to this list. The nomenclature of the butterflies is altered to make it accord with Staudinger's last catalogue.

1. *Apatura iris*—*Salix caprea*, *S. aurita*.
2. " *ilia*—*Salix*, *Populus tremula*, *P. dilatata*.
3. " " var. *clytie*—*Populus tremula*, *P. canescens*.
4. *Limenitis populi*—*Populus tremula*.
5. " *camilla*—*Lonicera cœrulea*, *L. xylosteum*, *L. caprifolium*,
L. periclymenum.
6. " *sibilla*—Same plants as the preceding.
7. *Vanessa levana*—*Urtica dioica*.
8. " *egœa*—*Salix*, *Parietaria officinalis*.
9. " *C. album*—*Ulmus campestris*, *Humulus lupulus*, *Urtica urens*, *Ribes rubrum*, *R. grossularia*, *Corylus avellana*, *Lonicera xylosteum*.
10. " *polychloros*—*Pyrus communis* (pear), *P. malus* (apple), *P. cydonia* (quince), *P. cerasus* (cherry), *Ulmus*, *Salix*, *Populus*, *Cornus*.

11. *Vanessa xanthomelas*—Populus, Ulmus, Salix caprea, S. acuminata, S. glauca, S. vitellina.
12. " *L. album*—Ulmus, Salix.
13. " *urtica*—Urtica hispida, etc.
14. " *io*—Urtica, Humulus.
15. " *antiopa*—Salix, Betula, Populus, Tilia (Ulmus is not given.)
16. " *atalanta*—Urtica dioica, U. urens.
17. " *cardui*—Cirsium oleraceum, C. arvense, C. palustre, C. lanceolatum, Carduus natans, Malva rotundifolia, Gnaphalium arenarium, G. luteoalbum, Achillea millefolium, Artemisia vulgaris, Filago arvensis, Onopordum acanthium, Cynara scolymus, Centaurea benedicta, Urtica dioica, Carlina.
18. *Argynnis aphirape*—Polygonum distorta, Viola palustris.
19. " *selene*—Viola canina, V. tricolor.
20. " *euphrosyne*—Viola canina.
21. " *pales*—Viola montana.
22. " *dia*—Viola odorata.
23. " *daphne*—Viola, Rubus idæus, R. fruticosus.
24. " *ino*—Urtica.
25. " *lathonia*—Viola arvensis, V. tricolor, Hedysarum onobrychis, Anchusa officinalis.
26. " *aglaja*—Viola canina.
27. " *niobe*—Viola odorata, V. tricolor.
28. " *adippe*—Viola odorata, V. tricolor.
29. " *paphia*—Hesperis tristis, Viola canina, Rubus idæus, Urtica.
30. " *pandora*—Viola.
31. *Melitæa cynthia*—Plantago lanceolata, Pedicularis rostrata.
32. " *maturna*—Melampyrum nemorosum, Populus tremula, Salix capræa, Fraxinus excelsior, Veronica, Plantago.
33. " *aurinia*—Geranium sanguineum, Scabiosa, Veronica, Plantago.
34. " *cinxia*—Plantago lanceolata, Veronica, Hieracium pilosella, H. canescens.
35. " *phæbe*—Centaurea scabiosa, C. jacea.
36. " *trivia*—Verbascum thapsus, V. nigrum.
37. " *didyma*—Artemisia abrotanum, Plantago, Centaurea, Stachys, Linaria vulgaris, Veronica, Teucrium chamædrys.

38. *Melitæa dictynna*—*Melampyrum nemorosum*, *Spiræa aruncus*, *S. ulmaria*, *Veronica*.
39. " *athalia*—*Melampyrum sylvaticum*, *M. pratense*, *M. nemorosum*, *Plantago*, *Veronica chamaedrys*, *Chrysanthemum corymbosum*, *Digitalis ochroleuca*.
40. " *aurelia*—*Plantago*.
41. " " var. *britomartis*—*Veronica chamaedrys*, *Melampyrum pratense*.
42. " *parthenie*—*Plantago lanceolata*, *Centaurea jacea*, *Melampyrum pratense*.
43. *Nemeobius lucina*—*Rumex*, *Primula*.
44. *Thecla betula*—*Prunus spinosa*, *P. armeniaca*.
45. " *spini*—*Rhamnus saxatilis*, *R. cathartica*, *R. frangula*, *Prunus spinosa*, *P. domestica*.
46. " *W. album*—*Ulmus campestris*.
47. " *ilicis*—*Ulmus*.
48. " *acaciæ*—*Prunus spinosa*.
49. " *pruni*—*Prunus spinosa*, *Amygdalus communis*, *Rhamnus cathartica*.
50. " *rubi*—*Prunus spinosa*, *Rhamnus*, *Cytisus*, *Hedysarum onobrychis*, *Amygdalus persica*, *Rubus*, *Genista*, *Ledum palustre*.
51. *Lycæna bætica*—*Spartium*, *Colutea*, *Phaca bætica*.
52. " *telicanus*—*Lythrum salicaria*.
53. " *argiades*—*Lotus corniculatus*, *Anthyllis vulneraria*, *Medicago falcata*, *M. lupulina*, *Trifolium arvense*, *T. pratense*, *Pisum sativum*.
54. " *argyrotoxa*—*Genista*, *Colutea arborescens*, *Trifolium*.
55. " *argus*—*Rhamnus*, *Trifolium montanum*, *Mellilotus officinalis*, *Genista germanica*, *Spartium scoparium*, *Hedysarum onobrychis*, *Lotus corniculatus*, *Erica vulgaris*.
56. " *optilete*—*Vaccinium oxycoccos*.
57. " *orion*—*Sedum telephium*.
58. " *astrarche*—*Erodium cicutarium*, *Geranium dissectum*, *G. pusillum*.
59. " *icarus*—*Trifolium*, *Mellilotus*, *Genista*, *Ononis spinosa*, *Astragalus glycyphyllos*, *Fragaria vesca*, *Medicago*.

60. *Lycæna bellargus*—Trifolium, Coronilla varia, C. montana, Hippocrepis comosa, Genista sagittalis, Stachys.
61. " *coridon*—Vicia, Astragalus, Coronilla varia.
62. " *hylas*—Trifolium, Mellilotus officinalis.
63. " *dolus*—Trifolium.
64. " *damon*—Hedysarum onobrychis.
65. " *argiolus*—Rhamnus frangula, Mespilus, Pyrus malus.
66. " *minima*—Anthyllis vulneraria.
67. " *semiargus*—Mellilotus.
68. " *cyllarus*—Astragalus glycyphyllos, Trifolium, Mellilotus, Genista sagittalis, G. germanica, Hedysarum onobrychis.
69. " *jolas*—Colutea arborescens.
70. *Polyommatus virgaureæ*—Solidago virgaureæ, Rumex acutus, R. acetosa.
71. " *dispar*—Rumex, Polygonum.
72. " *hippotoe*—Rumex acetosa.
73. " *alciphron*—Rumex acetosa.
74. " *dorilis*—Rumex acetosa, R. acetosella.
75. " *phleas*—Rumex acetosa.
76. " *amphidamas*—Rumex acetosa, Polygonum bistorta, Viola canina.
77. *Rhodocera rhamni*—Rhamnus cathartica, Frangula, Mespilus germanica, Pyrus.
78. " *cleopatra*—Rhamnus alpinus.
79. *Colias palæno*—Hydrocotyle vulgaris, Vaccinium uliginosum.
80. " *hyale*—Coronilla varia, Trifolium, Vicia.
81. " *myrmidone*—Cytisus biflorus, C. nigricans.
82. " *edusa*—Onobrychis, Cytisus.
83. *Pieris brassicæ*—Brassica, Rhamnus sativus, Cochlearia armoracia, Sinapis, Lepidium sativum, Tropæolum, Cheiranthus annuus.
84. " *rapæ*—the same plants as the preceding, and also Reseda.
85. " *napi*—Brassica oleracea, B. napus, Reseda lutea, R. luteola, R. odorata, Turritis glabra, Alliaria officinalis, Sinapis.
86. " *daphidice*—Reseda lutea, Turritis glabra, Erucastrum, Rhamnus raphanistrum, Sisymbrium sophia, Capsella bursa-pastoris, Alyssum incanum, Sinapis, Thlaspi.

87. *Aporia crataegi*—Crataegus oxyacantha, Prunus spinosa, P. domestica, P. padus, Pyrus malus, P. communis, Mespilus, Sorbus.
88. *Anthocaris cardamines*—Alliaria officinalis, Cardamine impatiens, Turritis glabra, Brassica campestris, Hesperis, Sinapis, Thlaspi.
89. *Leucophasia sinapis*—Lotus corniculatus, Lathyrus pratensis, Trifolium pratense (Sinapis is not given).
90. *Parnassius apollo*—Sedum album, Telephium, Sempervivum tectorum.
91. " *mnemosyne*—Corydalis bulbosa, C. solida.
92. *Papilio sinon*—Prunus spinosa, P. domestica, Pyrus malus, P. communis, Amygdalus persica, A. communis, Quercus.
93. " *machaon*—Carum carui, Anethum foeniculum, Apium graveolens, Daucus carota, Pimpinella saxifraga, Angelica sylvestris, Peucedanum chabrei, Heracleum, Oreoselinum.
94. *Nisoniades tages*—Iberis pinnati, Eryngium campestre, Lotus corniculatus, Coronilla varia.
95. *Spilothyrus alcea*—Malva.
96. *Syrictus alveus*—Polygala chamæbuxus.
97. " *malva*—Malva moschata, Plantago lanceolata, Fragaria, Comarum, Rubus.
98. " *sao*—Rubus idæus.
99. *Carterocephalus palemon*—Plantago.
100. *Hesperia sylvanus*—Plantago major, Althea rosea, Malva moschata, Lavatera communis.
101. " *comma*—Coronilla varia.

NOTES ON COLLECTING CATOCALAS.

BY ROBERT BUNKER, ROCHESTER, N. Y.

In many respects the Catocalas are among the most interesting of the moths. The contrast of color between their fore and hind wings renders them objects of great beauty, and hence these fair forms of the woods

are eagerly sought after by collectors. My spare time this season was spent in collecting Catocalas. In this part of the country they may be found from the first of June till the first of November. *Amasia* and *ultronia* are seen first; I took a fine *amasia* on the 29th of May, and an *ultronia* on the 10th of June. *Cara* and several other species may be found as late as the first of November.

Oak woods, where the trees are young and sufficiently scattered to admit the sunlight, are the most favorable places for collecting. In a small piece of woods of not more than four acres, I captured thirty-two specimens, among which were thirteen different species. I was unable to visit the place more than eight times; probably many more could have been taken had my visits been more frequent. My collecting was done in this manner: On approaching a tree I examined the trunk carefully up as high as the first limbs; if a Catocala was seen, and low enough down to reach, I used a paper box (collar box) to secure the prize, but if high up the net was brought into requisition. If I failed to find one, I gave the tree a vigorous shake, and if one was lurking anywhere about the trunk it was sure to start up and fly, generally but a short distance, when it would settle, and by cautiously approaching the tree I found no difficulty in securing it. Sometimes two would start up from one tree, generally male and female, and in such a case it was no easy matter to follow both of them; still I generally managed to secure them. As I examined trees I marked them with chalk to save the trouble of working the ground twice over.

Catocalas, like the lappet moths, usually alight on objects that harmonize with their own colors. Those with light grey fore wings were found on white oak (*Quercus alba*), and those with dark wings, like *epione* and *cara*, on black oak (*Quercus nigra*).

In a late number of the ENTOMOLOGIST, Mr. Grote gave us a list of the Catocalas, fifty-nine in number; he now adds four new ones to the list. My impression is that additional species will be found in the northern and middle States.

ON SOME OF OUR COMMON INSECTS.

12. THE AMERICAN COPPER UNDERWING—

Amphipyra pyramidoides, Guen.

BY THE EDITOR.

This insect is a troublesome one in many parts of our province, and is yearly increasing. It first attracted attention by its depredations on the foliage of the vine, but now, with us, while it is still a plague in the vinery, it is more abundant on plum and apple trees, and is also common on the thorn. It has been known in popular language as "the pyramidal grape vine worm" on account of the larva having a pyramidal hump near the end of its body; also as "the green grape vine worm," in consequence of the larva being of a green colour, but since it is not by any means restricted to the grape, we prefer the common name placed at the head of this article—"the American copper underwing"—given to it because the hind wings of the moth are of a lustrous copper colour. A very similar moth, *Amphipyra pyramidea*, Linn., is common in Europe, the larva of which feeds on the oak, elm, poplar and other trees, and since this insect is known in England as "the copper underwing," we think the common name we have referred to, which was first suggested by Mr.

Fig. 3.



Riley, is a very appropriate one for our species.

The larva, of which a very good representation is given in figure 3, first attracts notice early in June, when it may be found about half grown and feeding vigorously; by the middle of the month it has usually attained its full size, when it measures from one and a quarter to one and a half inches in length. The head is rather small, flattened in front, and of a whitish green color, with the mandibles tipped with black. The body is of a delicate whitish green, a little darker on the sides, with a white stripe down the back, a little broken between the segments and somewhat widened behind. On each side, close to the under surface, there is a

bright yellow stripe which is most distinct on the hinder segments, and a second one of the same color, but fainter, half way between this and the dorsal line; this latter is more distinct on the posterior portion of the body, where it follows the peculiar pyramidal hump or prominence on the twelfth segment, as shown in the figure. The under surface of the body is pale green.

When full grown this caterpillar descends to the ground, and, drawing together some loose fallen leaves or other rubbish, spins within a loose silken cocoon, where in due time it changes to a dark, shining brown chrysalis, from which the moth usually escapes in the latter part of July; those which we have reared have appeared about the 20th of the month.

The moth, see figure 4, measures, when its wings are expanded, about one and three quarter inches.

Fig. 4.



The fore wings are dark brown, shaded with paler brown, and with dots and wavy lines of a glossy grey or dull whitish hue. The hind wings are reddish with more or less of a coppery lustre; browner on the outer angle of the front edge of the wing, and paler towards the hinder and inner angle.—

The body is dark brown with the hinder portion banded with lines of a paler shade. The under surface of the wings is much lighter in color than the upper.

In what stage of its existence this insect passes the winter months has not yet been determined. Whether the eggs, which are probably laid during August, remain dormant during the remainder of the summer and hatch early the following spring, or whether the eggs hatch into larvæ early in the fall, and the larvæ, while still young, become torpid and sleep through the long winter months, remains undecided; we incline, however, to the latter view.

Where the caterpillars prove troublesome their numbers may be lessened by jarring the trees or vines on which they are feeding with the hand, when they will usually drop to the ground, where, on account of their green color, they can be readily seen and destroyed.

ON ANISOPTERYX VERNATA AND POMETARIA.

BY H. K. MORRISON, CAMBRIDGE, MASS.

There has been some confusion lately in regard to the limits and synonymy of these two common species, partially due to Dr. Harris' unsatisfactory reference to them in his "Report on the Insects of Massachusetts," 1841, and to the inaccessibility of Prof. Peck's original description of *A. vernata*.

In the numerous notes on these species and references to them in recent publications, they are in nearly all cases confounded together or wrongly determined; and I have not found them correctly named in a single collection which I have examined.

I reprint the descriptive portion of Prof. Peck's excellent essay. He was only acquainted with *vernata* and makes no reference to any other species. Dr. Harris considered *pometaria* the true "canker worm," and *vernata* a variety; on what grounds I do not know, as the latter is much the commoner, and, I presume, the most destructive. The following description of *vernata* was published in the Massachusetts *Magazine*, vol. vii, Sept. and Oct., 1795, and reprinted in 1827 in the New England *Farmer*, vol. v.:

"*Phalaena vernata, geometra geticornis, alis cinereis, fascii tribus obscuris, fuscis, posticis immaculatis, femina aptera.* The wings are ash color "with three obscure blackish transverse stripes, and a small dash of the "same color at the tip; the under wings are of a uniform color and "rather lighter than the ground color of the upper ones. The body of "the female is nearly four lines in length, ash colored and marked on the "back with a brown list extending from the thorax to the tail. In thirteen "days the females deposit their eggs; these are placed in the crannies of "the bark in the forks of small branches, and where there are spots of "moss upon the smaller limbs; they seem most fond of insinuating "themselves in the cavities between its leaves. For this purpose they "are furnished with a tube through which the egg is passed. The egg is "elliptic, one-thirtieth of an inch in length, of a pearl color with a "yellowish cast. The larvæ when full grown are about 9 lines long. The "head pale, marked on each side with two transverse blackish stripes, the

"back ash colored, marked lengthwise with small interrupted dusky lines. The sides blackish, with a pale line along the length of the body; there are two white spots on the last segment of the body. The abdomen beneath is ash colored. The chrysalis is about five lines long and one and one-half lines in diameter, of a light hazel color, oblong and pointed at one end. Their natural and regular time of rising is about the middle of March, but happens earlier or later according to the warmth or coldness of the season."

Dr. Harris described the male of what he considered the true "canker worm moth" as follows. The female he seems to have confounded with the females of *vernata*.

"The fore wings are ash colored, with a distinct whitish spot on the front edge near the tip; these are crossed by two whitish, jagged bands along the sides of which there are several blackish dots; the outermost band has an angle near the front edge, within which there is a short, faint, blackish line, and there is a row of black dots along the outer margin close to the fringe. The hind wings are pale ash colored, with a faint blackish dot near the middle. The wings expand about one inch and a quarter. This species may be called *Anisopteryx pomectaria*."

It has been thought that perhaps these two forms were the autumnal and vernal broods of the same species.

That the two species are entirely distinct, differing from one another in the most positive and unmistakable characters, has been abundantly shown by Mr. B. Mann in the Proceedings of the Boston Society of Natural History.

I give below the distinctive characters of the two species arranged in the most convenient form for comparison. It will be noticed that while the species resemble each other closely externally, the differences, particularly in the females, are in many cases structural.

Vernata, Peck.

The first seven rings of the abdomen in both sexes bear each upon the back two transverse rows of stiff red spines, pointing towards the end of the body.

Pomectaria, Harr.

The first seven rings of the abdomen in both sexes with no spines upon the back.

Fore wings of male ash colored or brownish gray, the whitish spot found on the fore wings of *pometaria* wanting.

The whitish bands found on the fore wings of *pometaria* are wanting, but there is a jagged, submarginal white band on the upper side of the fore wings in most specimens.

Three interrupted dusky lines across the fore wings, instead of two lines as in *pometaria*; sometimes these lines are only indicated by dark spots on the costa and by blackish dashes at the crossing of the median nervure.

There is an oblique black dash near the tip of the fore wings, also a distinct, nearly uniform, continuous black line before the fringe.

The white band found on the hind wings of *pometaria* is wanting.

Abdomen of the female terminating in a retractile ovipositor rather acutely tapering behind.

Body and legs of the female clothed with whitish and dark brown dentate scales; general coloration not uniform; a black, dorsal, longitudinal, interrupted band on the abdomen; a whitish patch on each side of the beginning of the band; the spines often give a reddish tinge to the part they occupy.

Fore wings of male ash colored, with a distinct whitish spot on the front edge near the tip.

Forewings crossed by two whitish jagged bands; the outermost band has an angle near the front edge; the whitish bands are sometimes obsolete, in which case only the whitish spot remains.

Along the sides of the whitish bands there are several blackish dots, each on a nervule, and all generally connected together by a dusky band which includes them.

Within the angle of the outermost whitish band, near the front edge, there is a short, faint, blackish line, and there is a marginal row of black dots before the fringe.

In most specimens a curved white discal band extending across the hind wings.

Abdomen of the female without ovipositor, terminating bluntly.

Body and legs of the female smooth, clothed with glistening brown and white truncate scales intermixed, giving the body the appearance of uniform shining, dark ash color above, and gray beneath.

In regard to the time of appearance of the species, *vernata* emerges in the spring (March and April). I have never seen a specimen taken in the autumn. It is by far the commoner of the two. *Pometaria* is not so common as *vernata*, and the great majority of specimens emerge in the fall or early winter, very rarely a few remaining over until the spring. The spring specimens of the male are very strongly marked, of a dark smoky brown, resembling somewhat in coloration the dark suffused variety of *Cleora pulchiaris*, Minot. Although I have searched particularly for them, I have never been able to take but two males. The females seem to be more common in the spring, and do not differ from the fall specimens.

I have examined 150 male, 70 female *vernata*; 40 male, 60 female *pometaria*, taken in the autumn, and 2 male, 10 female *pometaria*, taken in the spring.

NOTES ON THE LARVA OF BOARMIA LARVARIA, GUENEE.

BY THE EDITOR.

Several of the larvæ of this species were taken on the 24th of June; they were found feeding on willow and taken by beating the bushes over an umbrella.

Length one inch; body cylindrical.

Head medium-sized, flat, bilobed; brownish grey in front, a little darker at the sides, with a patch of brownish black on the summit of each lobe, and a few short brownish hairs; mandibles brownish black.

Body above reddish brown, smooth and glossy, having here and there a greenish tint, and with many fine longitudinal lines of a slightly darker shade scarcely visible without a lens. On each segment, from fifth to twelfth inclusive, there are two small black dots on each side of the dorsal line, and on sixth segment a black tubercle with a small patch of white at its base in front. On seventh, eighth, ninth, tenth and eleventh segments are similar black tubercles, but much smaller, with a whitish dot on the anterior part of the base of each, most distinct on tenth and eleventh

segments. Twelfth segment with two scarcely raised black tubercles above, a short black streak on each side behind them, and a small whitish spot in front; terminal segment with a few very fine short brownish hairs. Spiracles small sub-oval, pale ringed with black.

Under surface similar to the upper, with the greenish tint a little more decided and a central stripe of greenish white widening between the two pairs of prolegs; each segment from fifth to ninth has several small black dots. Feet yellowish green, faintly ringed with black at their base; prolegs green, marked with reddish brown on the outside.

Two specimens entered the chrysalis state on the 25th of June; one produced the imago on the 9th of July, the other on the 12th. The moth was kindly determined for me by Dr. A. S. Packard, Salem, Mass.

A DISSERTATION ON NORTHERN BUTTERFLIES.

BY WILLIAM COUPER, MONTREAL.

The Swallow-tail Butterflies which occur on the Islands of Anticosti and Newfoundland, and on the north coast of the Gulf of St. Lawrence are at present a subject of dispute, both as to species and position among the Papilionidæ. Having some knowledge of their localities and geographical range, I venture to state my opinion on the matter.

When I first visited the south coast of Labrador, in 1867, a Swallow-tail butterfly was taken by me at Natashquan, where it was rare. I supposed it then to be a boreal variety or race of *Asterias*, and on my return to Quebec presented two or three specimens to the Rev. Mr. Innes, who had a collection of Lepidoptera among which were specimens of a smaller *Papilio*, which he informed me came from St. John's Newfoundland. Mr. Innes removed afterwards to London, Ont., and I heard no more of the Labrador or Newfoundland *Papilios* until Mr. W. Saunders described his *Papilio brevicauda* in "Packard's Guide." Mr. Saunders obtained his specimen through the kindness of Mr. Innes, who told him that he had received it from an officer who had been spending some time at St. John's. If the *Papilios* taken by me at Natashquan, Labrador were in Mr. Innes' cabinet when Mr. S. obtained the specimen described as *brevicauda*, did Mr. Innes point them out to Mr. S. in order to compare with those from Newfoundland? This primary question should be answered, because there is no evident difference between the *Papilio* of

Anticosti and that of the Labrador coast.* Yet Mr. Saunders states (April 30th, 1873) "that he saw one of my Anticosti specimens at Mr. Mead's, in New York, but did not feel at all satisfied that it was identical with his *brevicauda*. *Polyxenes* is Scudder's new name for *asterias*, "but he (Scudder) does not regard *brevicauda* now as identical with it."

I have tried to obtain a specimen of the Newfoundland *Papilio*, and communicated with a gentleman residing at St. John's, Newfoundland, asking him to procure specimens of this swallow-tail butterfly for me. He says: "In my opinion it is very rare in this district. During the last three summers I have seen but one specimen, and some of my friends here confirm the opinion regarding its rarity." That he has reason to believe that in other parts of the Island it is more abundant, as he has heard of it at Cod Roy, on the western coast, and Notre Dame Bay, in the north of the Island. He adds "that a Halifax Entomologist has been enquiring for it on the south coast of the Island for some time, without success."

I am confident that it becomes scarce as we proceed down the south coast of Labrador, towards the Straits of Belle Isle. The true *habitat* of the *Papilio* (specimens of which I gave Rev. Mr. Innes in 1867) is the Island of Anticosti, where it occurs more abundantly than in Labrador or Newfoundland. It is met with occasionally at Mingan, but more commonly at the mouths of rivers east of Seven Islands.

The description in "Packard's Guide" does not exactly correspond with the external markings of the Anticosti specimens, and I candidly state that I have never seen a butterfly whose general features are more uniform than in that of the latter Island.

Mr. Edwards, of W. Virginia, states that it is not related to *asterias*, but to *machaon* and *zolicaon*. In a letter from him, dated August, 1873, he thinks that the Anticosti *Papilio* is undoubtedly *brevicauda*, Saunders, whose description was taken from a single ♀, and the fulvous prevailed remarkably in the yellow spots. That the description of *brevicauda* fits one of the Anticosti ♀ exactly. He points out, however, wherein the Anticosti *Papilio* differs notably in two respects from *machaon*, or the American representative of that, viz., *P. Aliaska*, Scudder, and from *zolicaon*. 1st—the hind wings are black, while in the others from base to

* The specimen Mr. Innes gave me was from Newfoundland. He did not show me Mr. Couper's specimens.—ED. C. E.

disc they are yellow. 2nd—the abdomen of the Anticosti species is spotted with yellow like *asterias*, while all the others have that part black with yellow lines, as in *turnus*. In a letter from Mr. Edwards, dated Sept. 1st, 1873, he says that “we had all been looking for affinity to *asterias*, while the butterfly belonged to another group. Strecker described it as a var. of *asterias*, and so Packard considered *brevicauda* a var. of *asterias*. In my synopsis I put the species down as a var. of *asterias*. It is many years since I saw the original *brevicauda*, and I have forgotten its appearance; but in reading over the description in Packard, I consider that the excess of fulvous is the only permanent distinction between the Newfoundland and Anticosti specimens.” Mr. Grote agrees with Mr. Edwards that the *Papilio* collected in Anticosti is *brevicauda*, Saunders, but I think my memory serves me correctly when I state that the specimens of *Papilio* in Mr. Innes’ collection from Newfoundland were considered distinct by the latter gentleman and myself, at that time. The Newfoundland specimens were smaller than those from Labrador; indeed, we looked on the St. John’s butterfly as dwarfed, but the species was not then determined.

Not having access to all the forms constituting connecting groups of *Papilios*, I am not prepared to concur with the gentlemen who have classed it with *machaon* or *zolicaon*. At first view the Anticosti butterfly takes the characters of *asterioides*, Reakirt, and *asterias*, while the form has a mere approach to *machaon* and *zolicaon*. I suppose it is on account of the latter affinity that Mr. Edwards places it near *machaon* and *zolicaon*, but there are these notable differences between the Anticosti *Papilio* and *P. Aliaska*, Scudder, or *zolicaon*, viz., 1st, the hind wings are black and the interior band underneath is constant in form and number of spots, and the spots are not wedged into each other as in *zolicaon* or *asterias*. 2nd, the abdomen is spotted with yellow similar to *asterias* and *asterioides*, and in fact, in my judgment, the Anticosti *Papilio*, with the exception of the width of the macular band, is a prototype of *asterioides*, Reakirt, from Mexico. Constancy of marks on the wings and body of an insect, no matter to what order it belongs, is undoubtedly *bona fide* evidence of the stability of the species.

We have evidence of European insects introduced into this country becoming acclimatized and segregated in course of years, and a few of these which we now find holding a local existence on such islands as Anticosti and Newfoundland, may have in earlier times found it necessary

to search for more congenial localities, there becoming attached to new food plants, which, no doubt, have an influence in diversity of colors. We have an instance of this in the American representative of *Vanessa antiopa*, which is of rare occurrence in Anticosti; but where it retains the features of its English congener, while those taken in more southern latitudes assume a different coloration. Instance also the introduction of *Pieris rapae* into Canada of late years. This species has now a struggle to exist in the latitude of Quebec, but so long as its food plant is abundant it will continue with us. It has been gradually moving south, where, with a more favorable climate, it propagates extensively. This butterfly also shows the effects of climate in the appearance of a yellow variety. It may be possible that the butterflies called *brevicauda* by Mr. Saunders and *Anticostiensis* by Mr. H. Strecker, had a similar origin. The connecting link or affinity of *Papilio brevicauda* with *asterias* is only a perplexing attempt to make the Anticosti form an ally of the continental *P. polyxenes*, which is Scudder's new name for *asterias*.

I cannot find sufficient reason for such connection, as there is quite a distinction between the larva of *asterias* and that of the Anticosti butterfly. It may, however, be discovered that an affinity occurs in *P. asterioides* and *brevicauda* or *Anticostiensis*; and although the former is found in Mexico, I see no reason to doubt their connection in years gone by.*

Considering the present rate of travel of *Pieris rapae* southwardly, it may during the course of another twelve years reach Costa Rica, and there change so much externally as to be claimed as another variety, while the Canadian form will still be called the segregated species. Mr. Hermann Strecker, of Reading, Penn., in his "Rhap. et Hetero." No. 6, page 48, gives the geographical distribution of *asterias* as follows:—"The 'ordinary form, with but little variation, occurs from Canada to Florida,' taking a southern range, while it extends west as far as Colorado. He considers *asterioides* to be the tropical form of *asterias*, that *brevicauda*

* NOTE.—"The insects of separate arctic regions have a great mutual resemblance, and the difference between them increases in the successive concentric circles from the above regions towards the equator. It has been said that the advance of the glacial period was accompanied by the migration of insects southwards, and that the present distribution of insects was effected by the prevalence of this epoch, and by the succeeding temperate epoch."—F. Walker, F. L. S., in *Can. Ent.*, vol. iii, p. 148.

may be a segregated type peculiar to Newfoundland, while the species which he has named *P. Anticostiensis* is considered to be a sub-arctic form, peculiar to the Island of Anticosti and south coast of Labrador.

Messrs. Edwards and Strecker have given me considerable aid in forming the opinions which I now advance, and although the former states that the Anticosti *Papilio* is not related to *asterias* (as a group), the question of greatest import is as to whether it is connected with *asterias* and *asterioides* specifically.

Should the Newfoundland, Labrador and Anticosti *Papilios* turn out to be identical, I should hold that they are the segregated and original type, existing in their primitive concentric circle, and that the variations of *asterias*, which are now being discovered throughout the great extent of territory south and west of Labrador, are descended from the northern form, and that these varieties have changed by food and climatic influences. The northern *Papilio*, although differing in size, never varies in its coloration, and this peculiar feature of constancy constitutes the principal ground of my opinion. It may be discovered that the Newfoundland *Papilio* is different in some respects from those occurring in Labrador and Anticosti, but the proof that such is the case is not thus far sufficient to disturb the theory advanced, that one is a race of the other.

(To be Continued.)

CORRESPONDENCE.

PARASITES.—I collected two dozen chrysalids of *Pieris rapae* about the second week in January. They were taken indiscriminately from under the coping of a wooden fence in this city. All these chrysalids were filled with the larvæ of a small parasite, probably *Pteromalus puparum*. I have counted ninety-five in one chrysalis. It occurs to me that chrysalids containing these parasites could be sent to a great distance during winter, and it would be interesting to learn their progress in localities where *rapae* does not occur. I am certain that Montreal can supply them in any number. Mr. Caulfield informs me that another small parasite came from a chrysalis of *Grapta progne*.—WM. COUPER, 67 Bonaventure Street, Montreal.

DEAR SIR,—

On the 23rd and 24th of last July I caught 2 specimens of *C. philodice* ♀, of a white color, with a slight greenish shade, especially towards the inner margin of the hind wings. As these are the only times that I have happened to meet with this variety, I would like to know whether it is common or not.

About the end of July or the beginning of August last, I caught a very battered butterfly which closely resembles *L. ephestion*, Stoll., except that it has a row of white spots crossing the front wings and following very much the same direction as the outer edge of the white band of *L. arthemis*. The white spots are better defined on the under than on the upper side. The orange spots also on the front wings are very small and indistinct. Is this a distinct species or only a variety of *L. ephestion*?

Last year there was a second brood of *L. ephestion* at Portland, which appeared about the end of August. I believe that this is the first time within the last six years that this has occurred there. There appeared also, about the same time, a pretty plentiful supply of *G. comma*. These I constantly found alighted on the warm, sandy road, which they appeared to prefer to all floral attractions.

Within the last four or five years I have not been able to obtain a single specimen of *C. cardui* in the vicinity of Portland, though formerly they were quite common.

C. atalanta has also greatly decreased in numbers within the last two or three years. In 1872, out of 20 or 30 caterpillars which I tried to rear, only one arrived at maturity, most all the rest being infested with parasites.

Yours, &c.,

H. H. L., Montreal.

ANNUAL MEETING OF THE LONDON BRANCH.

The annual meeting of the London Branch of the Entomological Society of Ontario was held at the residence of Mr. W. Saunders, on the 17th of February.

A goodly number of members were present, and the following officers were elected for 1874: President, A. Puddicombe; Vice-President, H. P. Bock; Secretary-Treasurer, J. G. Geddes; Curator, J. Williams; Auditors, Messrs. C. Chapman and J. Griffiths.

A box of Lepidoptera from Miss Carey, of Amherstburg, was shown by Mr. E. B. Reed, containing some interesting specimens taken in that locality; among others there were fine examples of *Papilio thoas* and *Philampelus satellitia*.

W. Saunders exhibited a box of Coleoptera, embracing a large number of species kindly donated by Theodore L. Mead, Esq., of New York. Also, several boxes of European insects, presented by Francis Walker, Esq., of the British Museum. The Secretary was instructed to tender to Mr. Walker the sincere thanks of the Society for his continued liberality in this matter—the cabinets of the Society and those of the members also having been repeatedly enriched with valuable specimens through his kindness.

OBITUARY.

DR. LECONTE announced the death, at Davidsburg, York Co., Pa., on the 10th March, of Friedrich Ernest Melsheimer, M. D., a correspondent of the Academy, aged nearly ninety-one years. He inherited great taste for entomology from his father, H. F. Melsheimer, a clergyman, who cultivated natural science with much success, and not only was a highly esteemed correspondent of Knoch and other European entomologists of the end of the past and beginning of the present century, but an active collaborator with Say, the founder of descriptive entomology in the United States.

Dr. Melsheimer thus inheriting the tastes and the collection of his father, has preserved, for later investigators, the only authentic types of many of Mr. Say's species; and has also contributed no small proportion of the descriptions of Coleoptera, which appeared up to February, 1847. His memoirs on this subject, containing notes and descriptions of about four hundred and fifty-seven species, were printed in the 2d and 3d vols. of the proceedings of this Academy.

Entomology also owes to him the catalogue of the described Coleoptera of the United States, which, after revision by Prof. S. S. Haldeman and myself, was published by the Smithsonian Institution in 1853. It was the first work of bibliographical importance in the modern history of that branch of science, and gave a powerful impetus to its development in the United States, and has greatly diminished the labor of those who have continued the study of that department.

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Living an isolated life on his farm, remote from usual lines of travel, dependent almost entirely on letters for the sympathy and counsel of his fellow students, separated from libraries containing the results of modern research, and therefore dependent on the traditional knowledge received from Europe, which constituted in fact most of the intellectual capital of the founders of natural history in the United States, Dr. Melsheimer must be considered as a very remarkable instance of one who, with very limited opportunities, has worked honestly, to the extent of his abilities, to develop the powers of usefulness which were given him.

Modest, unpretending, affectionate to his family, devoted to his friends, industrious to the limit of human usefulness, his death, at such an advanced age, can only leave, with those who have enjoyed his acquaintance, a satisfaction that they have known so good a representative of the purer qualities of humanity.—*Proc. Acad. Nat. Sci., Phil.*

BOOKS RECEIVED.

- First, second and third Annual Reports of the United States Geological Survey of the Territories for 1867, 1868 and 1869, 8vo., pp. 286. From F. V. Hayden, U. S. Geologist.
- Sixth Annual Report of the United States Geological Survey of the Territories, embracing portions of Montana, Wyoming and Utah, for the year 1872. By F. V. Hayden, U. S. Geologist, 8vo., pp. 844, with numerous illustrations.
- Contributions to the Extinct Vertebrate Fauna of the Western Territories. By Joseph Leidy, from the U. S. Geological Survey, Washington, D. C.
- Aerididae of North America. By Cyrus Thomas, Ph. D., from the U. S. Geological Survey, Washington, D. C.
- Catalogue de Livres D'Histoire Naturelle. De E. Deyrolle Fils 23, Rue de la Monnaie, Paris.
- The Scottish Naturalist, January, 1874.
- Science Gossip, January, 1874.
- Nature, to January 22, 1874.
- Canada Farmer, to Feb. 2, 1874.
- Indiana Farmer, Jan., 1874.
- Contributions to Entomological Bibliography, up to 1862. By Albert Muller. No. 3.
- Newman's Entomologist, Nov. and Dec., 1873; Jan., 1874.
- The Zoologist, Dec., 1873., and Jan., 1874.
- The Entomologists' Monthly Magazine, Dec., 1873.
- The Horticulturist, Jan., 1874.
- Annals of the Lyceum of Natural History of New York, Nos. 6, 7, 8 and 9, to Feb., 1873.
- Hints for the Promotion of Economic Entomology in the U. S. By John L. LeConte, M. D.
- American Agriculturist, Feb., 1874.
- Monthly Report of the Department of Agriculture, Jan. 1874:
- Le Naturaliste Canadien, Janvier, 1874.
- The Western Rural, Chicago, to Jan. 24, 1874.
- Rural New Yorker, Jan., 1874.
- Maine Farmer, Dec. 29, 1873.

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